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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,776	06/28/2006	Teruaki Yamamoto	043890-0798	4941
20277 7590 12/21/2010 MCDERMOTT WILL & EMERY LLP 600 13TH STREET, N.W. WASHINGTON, DC 20005-3096			EXAMINER ARCIERO, ADAM A	
			ART UNIT 1727	PAPER NUMBER
			MAIL DATE 12/21/2010	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/584,776

**Applicant(s)**

YAMAMOTO ET AL.

**Examiner**

ADAM A. ARCIERO

**Art Unit**

1727

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 October 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 8-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**NEGATIVE ELECTRODE MATERIAL FOR LITHIUM SECONDARY BATTERY,  
NEGATIVE ELECTRODE USING THE MATERIAL, LITHIUM SECONDARY BATTERY  
USING THE NEGATIVE ELECTRODE, AND MANUFACTURING METHOD OF NEGATIVE  
ELECTRODE MATERIAL**

Examiner: Adam Arciero

S.N. 10/584,776

Art Unit 1727

December 16, 2010

**DETAILED ACTION**

1. The Applicant's response filed on October 13, 2010 was received. Claims 1-10 are currently pending. Claims 1, 6 and 8 have been amended. Claims 8-10 remain withdrawn from consideration.
2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in a prior Office Action.

**Claim Rejections - 35 USC § 103**

3. The claim rejections under 35 U.S.C. 103(a) as being unpatentable over Shimamura et al. and Nakamoto et al. on claims 1-7 are maintained. The rejections are repeated below for convenience.

As to Claims 1, 3 and 6-7, Shimamura et al. discloses a negative electrode having a negative electrode material for a lithium secondary battery (claims 6-7) which is capable of storing and emitting lithium ions (pg. 3, [0038]). Said electrode material comprises a composite particle including a solid phase A which consists of silicon and a mixed phase B which consists of a transition metal element and silicon (intermetallic compound) (pg. 3, [0038]). Shimamura et al. further discloses wherein the mixed phase is microcrystalline (pg. 3, [0025]). Shimamura et

al. does not specifically disclose a carbon material adhered to a part of the surface of the basic material particle and a film having a silicon oxide formed on a surface portion of the base material particle and not on the carbon.

However, Nakamoto et al. discloses that fibrous carbon is fixed over a part of the surface of a negative electrode material comprising a Si composite (paragraph [0016]). At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the electrode material of Shimamura et al. by fixing fibrous carbon (claim 3) to the composite particle, because Nakamoto et al. teaches that even if the particle is expanding and contracting with the occlusion and discharge of lithium, the contact state of each particle and the carbon conducting agent is well maintained, and charge/discharge cycle life is increased (paragraph [0016]). Neither Nakamoto et al. or Shimamura et al. disclose manufacturing the negative electrode in a non-oxidative atmosphere (without the presence of oxygen). Therefore, after forming the fibrous carbon particles on the composite particle of Shimamura et al., a natural slow-oxidation treatment will take place, forming a silicon oxide layer on the remaining exposed surface of the basic material composite particle. Furthermore, it is the position of the Examiner that the properties of having a silicon oxide film formed on an exposed surface portion of the composite base material particle is inherent, given that the materials and methods for producing the negative electrode material of the prior arts and that of the present application are the same. A reference with is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. In re Robertson, 49 USPQ2d 1949 (1999).

As to Claim 2, Nakamoto et al. teaches of using a conductive agents such as graphite and carbon fibers (pg. 5, [0061]). Nakamoto et al. is clearly teaching that graphite and carbon fibers are considered functionally equivalent for use as conductive agents in negative electrode materials. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to substitute the graphite of Nakamoto et al. for the fibrous carbon of Shimamura et al., because Nakamoto et al. teaches that they are recognized equivalents.

As to Claim 4, Neither Nakamoto et al. or Shimamura et al. disclose manufacturing the negative electrode in a non-oxidative atmosphere (without the presence of oxygen). Therefore, after forming the fibrous carbon particles on the composite particle of Shimamura et al., a natural slow-oxidation treatment will take place, forming a silicon oxide layer on the remaining exposed surface of the basic material composite particle. Furthermore, it is the position of the Examiner that the properties of having a silicon oxide film wherein the amount of the film is at least 0.1 wt% and at most 1.0 wt% silicon in terms of oxygen amount, formed on an exposed surface portion of the composite base material particle is inherent, given that the materials and methods for producing the negative electrode material of the prior arts and that of the present application are the same. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. In re Robertson, 49 USPQ2d 1949 (1999).

As to Claim 5, Shimamura et al. discloses wherein the amount of carbon material is 1 wt% or more and 10 wt% or less (paragraph [0018]).

### **Response to Arguments**

4. Applicant's arguments filed October 13, 2010 have been fully considered but they are not persuasive.

*Applicant's principle arguments are:*

a) Examiner has not provided evidence that a silicon oxide layer would necessarily form via "*a natural slow-oxidation treatment*" (claims 1-7).

b) Applicants have shown unexpected results in Table 1 of the specification for the invention of claims 1 and 6 (claims 1 and 6).

In response to Applicant's arguments, please consider the following comments:

a) It is well known in the art and inherent that a silicon electrode material formed in an oxidative atmosphere (presence of oxygen) will inherently form a silicon oxide layer by a natural slow-oxidation treatment.

b) The results are not found to be significant and unexpected. In Table 1, the lowest capacity retention ratio for a battery of the present invention is 82%, which is only 5% greater than one of the batteries outside of the invention, having a capacity retention of 77%.

Furthermore, the results shown in Table 1 for the prior art batteries are not commensurate in scope with the prior art applied, as battery LC3 was performed in a non-oxidative atmosphere. Furthermore, battery LC2 comprises the claimed qualities and structure of independent claim 1, wherein an oxidation treatment is performed and the carbon is adhered. However, the results for battery LC2 (commensurate with the scope of claim 1) does not show unexpected or significant results.

**Conclusion**

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADAM A. ARCIERO whose telephone number is (571)270-5116. The examiner can normally be reached on Monday to Friday 7am to 4pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Adam A Arciero/  
Examiner, Art Unit 1727

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1727